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BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Application Number: 09/899,183
Filing Date: July 06, 2001
Appellant(s): MATSUNO ET AL.

Jeffrey A. Wyand
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed December 30, 2005 appealing from the Office action mailed June 2, 2005.

(1) Real Party in Interest

A statement identifying by name the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The statement of the status of claims contained in the brief is correct.

(4) Status of Amendments After Final

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

(5) Summary of Claimed Subject Matter

The summary of claimed subject matter contained in the brief is correct.

(6) Grounds of Rejection to be Reviewed on Appeal

The appellant's statement of the grounds of rejection to be reviewed on appeal is substantially correct. The changes are as follows: Are claims 16 and 18 unpatentable over Li (5,835,678) in view of Zhao (6,210,485)? Are claims 17 and 19 unpatentable over Li (5,835,678) in view of Zhao (6,210,485) and Onabe (JP 09-143738)?

(7) Claims Appendix

The copy of the appealed claims contained in the Appendix to the brief is correct.

(8) Evidence Relied Upon

5835677	Li	11-1998
6210485	Zhao	4-2001
JP 09-143738	Onabe	6-1997

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claims 15 and 17 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Li (5,835,678) taken in view of Zhao (6,210,485). Li (Fig. 1) discloses a CVD apparatus having a CVD reaction chamber connected to a vaporizer for vaporizing CVD source materials. The vaporizer (Fig. 2) includes a heated chamber having an inlet and a heat conductive chamber wall that houses the baffles 52, 54 and 56. A spray nozzle 24 is located to spray CVD precursor source materials into the chamber through the inlet, and a plate contacting and locating the tip end of the nozzle (see the baffle plate for distributing inert gas illustrated in Fig. 2 but unlabeled). It is noted that "locate" is defined as "to determine or indicate the place, site or limits of", and the plate of Li indicates the place, site or limits of the nozzle. Cooling jacket 26 is a cooling block that is provided for cooling the nozzle (see col. 8, lines 14-17). Li (5,835,678) (see Figs. 4, 5A and 5B and col. 12, line 1 to col. 13, line 4) makes clear that the cooling block is intended to be in physical contact with the nozzle. In view of Li's (5,835,678) description of his Figs. 4, 5A and 5B, it would have been inherent or at least obvious that the cooling block of Fig. 2 was in physical contact with the nozzle of Fig. 2.

Fig. 2 of Li also illustrates a middle portion (where thermocouple 32 is located) that is positioned between and connects the lower heated portion of Li's vaporizer with the cooled upper portion of the vaporizer. Li does not disclose the middle portion as designed or intended to act as a heat conduction restricting region, and in view of the schematic nature of patent drawings it is not clear from Li's Fig. 2 that the middle portion is a heat conduction restricting region. Zhao (Figs. 4 and 5) also discloses a vaporizer having a lower heated vaporization chamber and an upper cooled liquid delivery section. Zhao teaches (col. 7, lines 34-45, and col. 9, lines 29-35) that a middle "neck" portion located between and connecting the heated lower portion and cooled upper portion should be narrow to act as a heat conduction restricting region. Both the neck and the space around the neck act as a heat conduction restricting region. In view of the teachings of Zhao, it would have been obvious to one skilled in the art to intentionally design the middle portion of Li's vaporizer to be narrow enough to act as a heat conduction restricting region.

Claims 16 and 18 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Li (5,835,678) taken in view of Zhao and Onabe (JP 09-143738). Li (5,835,678) discloses the use of an ultrasonic nozzle to spray his liquid material to be vaporized, and he does not discuss the use of a nozzle having first and second coaxial tubes as claimed in claims 16 and 18. Onabe (Figs. 1 and 2), however, teaches that a source material can be atomized and sprayed by a nozzle having first and second coaxial tubes. Also, Zhao teaches the use of two coaxial tubes for spraying a source material. It would have been obvious to one skilled in the art to modify the apparatus of Li

(5,835,678) by substituting a spray nozzle having first and second coaxial tubes of the type taught by Zhao and Onabe for the ultrasonic spray nozzle of Li because they teach that such a coaxial spray nozzle is an alternate and successful way of spraying source materials into a vaporizer.

(10) Response to Argument

Applicants have argued that Li's apparatus does not include a cooling block that is in physical contact with Li's nozzle, and that the rejection is based on a contorted interpretation of Li's disclosure. In particular, applicants have argued that the part labeled 24' of Figs. 4 and 5B and the part labeled 24" of Fig. 5A are not portions of the nozzle, but instead refer to the driving portions of the ultrasonic nozzles. It is noted, however, that Li, from col. 12, line 1, to col. 13, line 4, does repeatedly refer to these parts as being his nozzle or at least part of his nozzle. Referring to Fig. 5B (see col. 12, lines 30-32), Li states "the nozzle mounting segment 25' and the ultrasonic nozzle 24' correspond to the nozzle mounting segment 25 and the ultrasonic nozzle 24 shown in Fig. 2". Li also states, for example (see sentence bridging cols. 12 and 13), that "in order to mount ultrasonic nozzle 24' onto the nozzle segment 25', as shown in Fig. 4, it is merely necessary to bolt the peripheral flange 33' (see Fig. 5b) on the ultrasonic nozzle 24' to the corresponding flange 37' on the nozzle segment 25', using bolts 39' as shown in Fig. 4. In this manner, removal and replacement of the ultrasonic nozzle itself is readily facilitated."

Applicants have argued that it is an unreasonable and contorted interpretation of Li to consider the nozzle 24' of Figs. 4 and 5B and the nozzle 24" of Fig. 5B to be

nozzles. It is noted, however, that the above quoted passages of Li show that Li himself uses the word "nozzle" to identify the nozzles 24' and 24". These quotations from Li were presented to applicants in the advisory action mailed August 15, 2005. It is not unreasonable or contorted to quote Li's own words. These quotations from Li are not an "interpretation" of Li, because they show Li speaking for himself.

Applicants have pointed out that Figs. 5A and 5B of Li do not illustrate a plate at the tip of the nozzle of the type shown in Fig. 2. It is noted, however, that Li at col. 12, lines 1-13, indicates that his Figs. 4-12 illustrate a modification of the apparatus of Fig. 2. Li states that the embodiment of Figs. 4-12 "incorporates all of the principles of the apparatus discussed above and shown in Figs. 1-3, but in which the atomizer and heatable contact surface are both removable modular units".

With respect to the atomizer nozzle, Li's primary additional teaching in Figs. 4-12 is that the nozzle of Fig. 2 should be modular and thus easily replaceable. Since Li intends his embodiment of Figs. 4-12 to include "all principles . . . shown in Figs. 1-3", it at least would have been obvious to include a plate for distributing curtain gas in the embodiment of Figs. 4-12 (Fig. 5B, for example). Alternatively, it would have been obvious to provide the apparatus as it is shown in Fig. 2 with a modular, easily replaceable nozzle. It is further noted in this regard that Li at col. 12, lines 47-50, indicates that the embodiment of Figs. 4-12 is intended to have "a curtain of gas, *such as that shown in Fig. 2*" (emphasis added).

Li describes his modular replaceable nozzle-piece as being the nozzle. See, for example, parts 22' and 24' of Fig. 4, and the accompanying description at col. 12, lines

20-23 of Li's specification. The nozzle 24' is the modular, replaceable part that is connectable and dis-connectable to the end of the feed tube 22' that supplies the liquid to be vaporized. This is analogous to a spray nozzle that can be replaceably connected to the end of a garden hose. As shown in Fig. 4, the modular replacable nozzle 24' is a projecting part that projects from the end of the feed tube 22' to which it is connected in the same way that a water spray nozzle projects from the end of a garden hose. See the attached dictionary definition of "nozzle".

Applicants have also argued that the limitation of "a heat conduction restricting region between the cooling block and the chamber wall, thermally isolating the spray nozzle and cooling block from the chamber wall" is not obvious from the combined teaching of Li and Zhao. It is noted, however, that Zhao provides a clear teaching at col. 7, lines 34-45, and also at col. 9, lines 29-35, that it is desirable to provide a vaporizer apparatus with a heat conduction restricting region between the cooling block of a spray inlet section and a heated chamber wall. Zhao teaches (col. 7, lines 34-45) that it is desirable to thermal insulate the upper region 100, which is kept cool by the cooling head 104, from the lower region 106, which is kept hot by the heater156. Zhao teaches (col. 7, lines 34-45) that this thermal insulation "prevents heat loss". The cool and hot regions of Zhao's vaporizer are directly analogous to the cool and hot regions of Li's vaporizer. It would have been obvious to one skilled in the art that the desirable features of thermal insulation taught by Zhao would have also been applicable to the vaporizer of Li. In view of the teachings of Zhao, one skilled in the art would have recognized that Li's vaporizer would also benefit from prevention of heat loss.

Therefore, it would have been obvious to provide Li's vaporizer with the heat conduction restricting region between the cooling block and heater chamber wall, as taught by Zhao.

It is noted also that Zhao at col. 9, lines 21-35, teaches that the cooled and heated region of the vaporizer can be thermally insulated from each other (1) by using a neck of small cross-section to reduce thermal conduction; (2) by using a material of construction for the neck that has a low thermal conduction property, such as PTFE or stainless steel and/or (3) by providing a metal membrane such as 226 of Fig. 4 which inhibits thermal conduction. In view of this teaching by Zhao, it would have been obvious to use any one of these three types of thermal insulation between the heated and cooled sections of Li's vaporizer. It would have been obvious, for example, to use a low thermal conductivity material such as PTFE or stainless steel for the portion of Li's vaporizer where Li's thermocouple 32 is located, between the cooled and heated portion of Li. Making this obvious modification to the vaporizer of Li, in accordance with the teachings of Zhao, meets the presently claimed limitation of "a heat conduction restricting region between the cooling block and the chamber wall, thermally isolating the spray nozzle and cooling block from the chamber wall".

It is noted also that the empty space around Zhao's narrowed neck represents "a heat conduction restricting region between the cooling block and the chamber wall, thermally isolating the spray nozzle and cooling block from the chamber wall".

Applicants have also argued that the neck 142 of Fig. 4 of Zhao is itself the chamber wall. Applicants therefore concluded that it is impossible for Zhao's neck to

provide thermal isolation of the cooling block from the chamber wall. It is noted, however, that Zhao (col. 7, lines 34-45) specifically teaches that the neck 142 forms a "thermal choke" between the heated and cooled sections, and reduces conduction of heat. Thus, while applicants argue that it is impossible, Zhao teaches that the neck 142 does provide the desired thermal isolation. As applicants have noted, it is chamber 146 of Zhao that is the vaporizing chamber. It is the walls of chamber 146 that are heated by heater 156 to provide the isothermal heating chamber desired by Zhao.

Furthermore, it is noted that it is Li who is cited in the rejection as the primary reference, with Zhao cited secondarily for his teaching that it is desirable to provide thermal insulation between the heated and cooled sections of a vaporizer. This teaching of thermal insulation by Zhao is properly combinable with the disclosure of Li, because one skilled in the art would have recognized that Li's heated and cooled sections were subject to the same thermal gradient problems that are identified by Zhao. One skilled in the art would have recognized that it was just as desirable to "prevent heat loss" in the vaporizer of Li as it was in the vaporizer of Zhao.

Regarding the word "adjacent", as noted in the advisory action mailed August 15, 2005, there is really no disagreement on the meaning of this word, because its meaning is clearly defined as "near" or "close". Any dictionary will provide a clear definition of "near".

(11) Related Proceeding(s) Appendix

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

Richard Bueker

Richard Bueker

Conferees:

Parvis Hassanzadeh

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